

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
20 March 2003 (20.03.2003)

PCT

(10) International Publication Number  
WO 2003/023179 A3

(51) International Patent Classification<sup>7</sup>: E21B 43/10

[US/US]; 11007 Sprucedale Court, Houston, TX 77070 (US). RING, Lev [RU/US]; 14126 Heatherhill Place, Houston, TX 77077 (US). BRISCO, David, PAUL [US/US]; 405 Westridge Drive, Duncan, OK 73533 (US).

(21) International Application Number: PCT/US2002/025727

(74) Agents: MATTINGLY, Todd; et al.; Haynes and Boone, LLP, 1000 Louisiana Street, Suite 4300, Houston, TX 77002-5012 (US).

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/25727

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : E21B 43/10  
 US CL : 166/380, 207

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 166/380, 207, 378, 212, 217, 242.6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,070,671 A (CUMMING et al.) 06 June 2000 (06.06.00), figures 1 and 2.	13-15,17,18,21-23,25-31, and 33
X	US 6,085,838 A (VERCAEMER et al.) 11 July 2000 (11.07.00), figures 5-7.	1,4-7,11-19, and 21-35
X	SU 1086118 A (GARIFOV) 15 April 1984 (15.04.84), figures 1 and 2.	13-15,17-23,25-31, and 33-36

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

07 October 2002 (07.10.2002)

Date of mailing of the international search report

19 FEB 2004

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks  
 Box PCT  
 Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

David Bagwell

Telephone No. (703) 308-1113